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/A SELF REPORTING SCALE FOR INDICATING  
EMOTIONAL STATES OF DEVELOPMENTALLY DISABLED  
ADULT HORTICULTURAL WORKERS/

by

STEPHEN C. MOORE

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Approved by:

Richard H. Mattson

Major Professor

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## INTRODUCTION

Horticulture has been anecdotally recognized as having a positive effect on human emotions since the late 1700's when Dr. Benjamin Rush observed its effects on psychiatric patients (Olszowy, 1978). Horticulture continued to be used as a therapeutic medium through the years, but the process did not receive close scrutiny until Dr. Karl Menninger initiated what he termed "horticultural therapy" activities at the Veterans Administration Hospital in Topeka, Kansas, at the end of World War II (McCandliss, 1967). Since that time, horticulture has been effectively used with geriatrics, physically disabled, correctional inmates, and mentally retarded people (Lewis, 1973).

Incidental evidence is beginning to emerge concerning the effects plants and plant-related environments have on people. Rachel Kaplan (1978), in a study conducted for the American Horticultural Society, reported "peace and tranquility" as the primary reason for gardening. Doxon (1985) established that positive stress reducing physiological changes occurred when developmentally disabled adults worked with greenhouse plants. However, horticultural therapists have no evidence to substantiate the commonly held belief that plants and plant environments promote positive emotional effects on the mentally retarded individual. And, what may be an even more pressing need, these therapists lack information about individual clients which could substantially improve training procedures.

While horticulture has been used successfully with the mentally retarded, it has been primarily used as a prevocational and vocational tool rather than a therapeutic modality (Copus, 1980). Traditionally, emphasis of programs

designed for this population has been from a strict behavior modification viewpoint, on the assumption that most behaviors are learned and continue because they are reinforced (Jacobs, Larsen and Smith, 1979). Training tends to be centered on observable behavior, usually associated with specific vocational skill deficits.

Currently, classification of mental retardation can be made only when impairments of adaptive behavior are present as a result of, or in association with, deficits in intellectual functioning (Grossman, 1983). Maladaptive behavior is a difficult area to measure, but according to MacMillan (1983), the American Association of Mental Deficiency's Adaptive Behavior Scale (ABS) is a recommended instrument to use. The ABS has two parts; Part I contains domains related to adaptive behaviors, while Part II covers domains of behavior related to personality and behavior disorders. Fourteen domains are listed in Part II, 13 of which could easily be used to determine emotional difficulties.

In recent years, concern has been expressed that mental retardation alone cannot account for maladaptive behavior covered by those domains listed in the ABS, Part II (Senatore, Matson and Kazdin, 1985). Researchers began to question the idea that behaviors which would be treated as a psychological problem in nonretarded individuals are passed off as characteristics of the handicap in the mentally retarded. As a result, investigation was undertaken to determine the extent that the retarded suffered from psychological disorders, with findings varying between 25 percent and 87 percent of the retarded population suffering from such disorders (Menolascino, 1965; Phillips and

Williams, 1975). The wide variance in prevalence results from a reluctance to ascribe psychological disorder to the retarded, and from a lack of well-established measurement devices (Menolascino, 1965).

The primary goal of this study was to develop a procedure for horticultural therapists to assess emotional status of the mentally retarded resulting in more efficient training. Specific objectives were threefold: 1) to develop a dual self-reporting/trainer charting instrument for measuring emotional status of the mentally retarded. This instrument will be called the "Horticulture Evaluation Test for Adult Developmentally Disabled-Psychological Section" (HETA-Psych, Appendix B). 2) To field test the instrument in a long and short form over a four week period using horticultural activity comparisons as part of the vocational rehabilitation program; 3) To determine if differences exist in moods of clients which may be critical in terms of effective training.

An abbreviated version of the results of this study, prepared for publication in The Journal of Rehabilitation, dictates that it be done in manuscript style.

## LITERATURE CITED

Therapy Through Horticulture

Plants and plant environments have been reported as having beneficial effects on a variety of disabilities (Gillespie, 1980; Haller, 1973; Tereshkovich, 1975). With roots based in psychiatric programs, the field of horticultural therapy developed around psychological concepts. Not surprisingly, many of the early programs were established in psychiatric facilities (Flournoy, 1975; McCandliss, 1967; Moore, 1978).

Psychiatric programs soon began to share the horticulture programs with other disciplines, such as geriatrics (Thomas, 1978), and physical disabilities (Brooks and Oppenheim, 1973). Thomas reported on horticultural activities being used with much success in a geriatric community, and much of the early research in horticultural therapy took place in institutional geriatric settings (Crandall, 1975; Train, 1974). Brooks and Oppenheim reported that horticultural therapy could be used for mental retraining with physical disabilities.

Research has not been presented to support the claim that horticulture has beneficial effects on the psychological status of those involved in plant activities, although such claims are made (Haller, 1973; Moore, 1976; Relf, 1981). Hefley (1973) listed improved self-confidence and self-esteem, enthusiasm for the future through interest-promoting activities, release of aggressive drives, and the satisfying of creative impulses, as emotional benefits to the mentally retarded, and Stephen Kaplan (1973) postulated that human perceptions are specifically keyed by plants as positive stimulus objects.

### Rehabilitation Through Horticulture

Professionals in the field of physical disabilities, such as amputations, cerebral palsy and spinal cord injuries, also began to develop horticultural techniques as an aid to rehabilitation (Chaplin, 1978; Hiott, 1978; White, 1972). Brooks, et al. (1973) reported that physical retraining exercises could be disguised in horticultural activities. Thus it was possible for needed physical activity to take a more meaningful role than simply "exercise for exercise sake."

Rehabilitation programs for correctional facilities and the mentally retarded soon followed those for the physically disabled. Jordan (1978) related that horticultural programs were used as vocational training in a corrections facility in Florida, and that inmates were employed in horticulture related positions upon release. Programs for the mentally retarded have become increasingly frequent over the years, most of which are aimed at vocational rehabilitation (Copus, 1980; Relf, 1981).

As horticulture programs developed in these varied fields, at least two items began to emerge on a consistent basis: 1) empirical research into the effects of horticulture on a disabled clientele was lacking, and 2) observers were reporting psychological benefits with nearly all disabilities.

Riordan (1983, p. 39) stated, "From a rigidly scientific or research standpoint, hortitherapy has not been subjected to the types of outcome studies that would enable rehabilitation workers to identify it as successful or unsuccessful under varying sets of conditions." This problem seems to stem from the idea that many professional horticultural therapists were initially interested in adapting horticultural activities for the disabled individual,



as can be seen by Shoemaker and Lauer's (1981) study designing an orchard for wheelchair gardeners. Other early research falls into the same vein. Candice Shoemaker (1982) used the well-established technique of modeling to teach horticultural skills to trainable mentally retarded adults. Krell (1983) took another well-established technique, social reinforcement, and used it as a tool to teach horticulture related activities to the same population, as did Morris (1978) using task analysis. These programs were successful, as can be seen when Priest (1984) found that developmentally disabled adults could make management decisions concerning plant quality characteristics, in some cases as well as professional horticulturists.

A major shift away from research aimed at adapting horticulture activities to the individual occurred when Laviana (1982) reported that plants effect human perceptions of the environment, and, indeed, found that plants caused a positive effect on perceptions of space being occupied. Thus, research changed from showing that the individual could manipulate the environment, to showing that the environment had a profound effect on the individual. Coxon (1985) continued this shift toward studying the effects of the environment on the individual when she measured changes in client stress related physiological responses in an adult training center environment, to that of a greenhouse environment.

#### Emotional Difficulties and the Mentally Retarded

The stereotype of the ever-happy Down's Syndrome child is still the picture of the retarded that many people hold. Yet Reiss, Levitan,

and McNally, (1982, p. 361) state, "Mentally retarded people who are also emotionally disturbed may constitute one of the most underserved populations in the United States." Their definition of emotional disturbances included anxiety problems, self-concept problems, interpersonal and social adjustment problems, depression, non-assertiveness, problems with anger, sexual dysfunction, social withdrawal, and schizophrenia. Menolascino (1970) supported this contention by indicating that low intelligence may increase the risk of emotional illness while decreasing the chances for adequate treatment.

Prevalence figures reflect this statement. During a screening of 616 children for possible mental retardation, 47 were found to be retarded as well as suffering from diagnosable psychiatric disorders (Menolascino, 1965). Szymanski (1977) found 54 percent of 132 children in a developmental disabilities clinic manifested emotional disturbances in various degrees. In assessing 100 children for mental retardation, Phillips, et al. (1975) found 87 percent also diagnosable as emotionally disturbed. Rutter, Tizard, Yule, Graham and Whitmore (1974) found a prevalence rate of psychiatric disorders four times greater for mentally retarded persons than for the nonretarded. Menolascino (1984a) has documented confirmed diagnoses of schizophrenia in the mentally retarded, suicide (1984b), and sexual dysfunction (Stark, McGee and Menolascino, 1984), reaffirming the idea that mental illness is observable at all levels of retardation, and that all types of mental illness can be found in the mentally retarded population.

### Areas of Needed Research

Much of the reluctance to ascribe emotional disorders in the mentally retarded persons centers around the difficulty in diagnosing the disability in a retarded population (Menolascino, 1984a). Menolascino further warns that diagnosis cannot be made on single symptoms because behavior modification techniques and medications are abusive to such signs even though mental illness is observed at all levels of mental retardation. Wilson (1984) warns that there is a lack of clinical studies involving the use of psychoactive drugs in a retarded population, although it is known that neuroleptic drugs, i.e. chlorpromazine (Thorazine) and thioridazine (Melleril), tend to have a longer response time in controlling psychotic behavior in the retarded than for a nonretarded population.

Another major problem in terms of acknowledging emotional difficulties in mentally retarded persons is a lack of suitable, well-established measurement devices. Anderson (1980) indicated that sources of assessment data in the mentally retarded are typically direct observation, reports of significant others, and case records, but, from a treatment perspective, such global categories are not sufficiently precise to be useful. Senatore, et al. (1985), in response to this deficiency, developed the Psychopathology Inventory for Mentally Retarded Adults, utilizing a self-report/informant format. This instrument is the only readily visible assessment designed exclusively for the determination of emotional difficulties in the mentally retarded.

A final problem in assessing emotional disabilities in the mentally retarded is that many horticultural therapists working with the mentally retarded disagree on the nature of therapy in horticultural activities. Burlingame (1973), for example, indicated that the retarded gain a sense of security from the monotony and repetition of some horticultural tasks. This idea has prevailed despite research showing that people, including the mentally retarded, need stimulation and variety in their environment if motivation is to be maintained (Blum and Naylor, 1968; McGee, 1984). Durbin (1973) supports this by maintaining that the advantage of horticultural activities for the mentally retarded is due to the variety of tasks available.

This study, then, was designed to develop an instrument capable of giving vocational rehabilitation specialists and therapists additional information about the emotional status of mentally retarded adults. A self-report/observer format was used to give clients the opportunity to report their own feelings as well as to test subjective evaluations of client emotions by observers. Word pairs were developed reflecting five different emotional, or emotionally related, categories. The use of word pairs have been used in several studies of nonretarded populations with success (Laviana, 1982; Lorr and Shea, 1979; Shostrom, 1964), but not with a retarded population. Several studies, however, have used the selected words as key elements of other forms of assessment which have in turn, linked the individual words to a mentally retarded population and to the specific emotional categories (Andrulis, 1977; Craft 1959; Meyerowitz, 1962; Gardner, 1966; Gardner, 1974).

The self-report/observer format was selected to provide an in-place reliability check for subject responses. Frequently observers have provided information about individual clients (Distefano and Pryer, 1968; May and Tuma, 1964), but, as Fischer (1979) indicates, clinicians are increasingly attempting to include clients more directly into the assessment process. The self-report/observer format is an attempt to include the client into the assessment process, as well as utilize the expertise of the trained observer.

### Hypotheses

In order to field test the HETA-Psych, four hypotheses were developed. Stated in the null hypothesis form, they are as follows: 1) No differences exist between short and long forms of an assessment instrument for reporting emotional states in the horticultural environment; 2) There will be no change in emotional states over time in the horticultural environment; 3) There will be no differences between mentally retarded adult workers in the greenhouse, landscape, and control groups when reporting emotional status; and 4) There will be no differences between mentally retarded adults and the trainer when reporting emotional states in the horticultural environment.

Identification of emotional states should aid therapists and rehabilitation specialists to improve training programs for the mentally retarded individual.

## METHODS

### Procedures

A questionnaire was developed to chart emotional status of mentally retarded adult horticultural workers, and was to be used in conjunction with the currently in-place Horticulture Evaluation Test for Adult Developmentally Disabled (HETA, Appendix A), a reliable instrument for measuring horticultural identification skills, and physical/mental abilities of mentally retarded adults (Shoemaker, 1982).

The questionnaire, labeled HETA-Psychological Section (Appendix B), consists of 20 adjective word pairs descriptive of five emotional, or emotionally related, categories: anger, fatigue, depression, anxiety and self-concept. Each word pair contained a positively weighted word and a negatively weighted word, and each pair approximated a description of one of the emotional categories. Each category contained four word pairs. Pairs from each category were randomly listed to deny the possibility of subjects becoming category-wise, and the first word in each pair was randomly positive or negative.

### Subjects

Thirty-two subjects were included in this study, sixteen of which were included in the horticultural phase, the remaining sixteen were control subjects. Equal numbers of men and women were participants in the study. Subjects were selected from two work training centers for the developmentally disabled, one center located in Colorado, the other in Kansas, with eight experimental and eight control subjects randomly

selected from each site. Sites were selected on the basis of in-place horticultural activities, the similarity of horticultural programs, and similarities between non-horticultural activities.

Experimental subjects were all involved in horticultural activities, either the greenhouse (prevocational) or the landscape (work adjustment) training, with four subjects from each area at each site selected. Control subjects included four individuals from prevocational programs and four from work adjustment programs at each site. Control activities included such tasks as paper recycling, wood working, and janitorial services.

Age: The ages of the Kansas prevocational subjects ranged from 24 to 59 with a mean age of 34.9 years, and ages for the work adjustment subjects ranging from 20 to 39 with a mean age of 26.5 years. Those subjects involved in prevocational programs in Colorado had ages ranging from 25 to 70 with a mean age of 37.8 years, and the work adjustment group ages ranged from 20 to 40 with a mean age of 32.5 years. Mean ages of the Kansas subjects was 30.7, and the Colorado subjects was 34.9 years.

IQ: Based on the Wechsler Adult Intelligence Scale, or the Wechsler Intelligence Scale for Children--Revised, the intelligence ratings for the prevocational subjects from Kansas ranged between 50 and 67, with a mean IQ of 56.8. Work adjustment subjects IQ's ranged from 33 to 77, with a mean IQ of 62.8. The Colorado prevocational group IQ's ranged from 30 to 67, with a mean IQ of 49.8, while subjects in work adjustment activities IQ's ranged from 35 to 77, with a mean of 61.8. The Kansas subjects IQ's had a mean of 59.8, and that of Colorado subjects was 55.8.

Before the study began, all subjects signed, or a parent or guardian signed, an informed consent form (Appendix D). At no time were subjects placed in a position of risk as a result of the study. Identifying data were coded, and keys to the code were kept under lock.

Sites were arbitrarily assigned as either Site 1 or Site 2.

#### Site Testing: 20 Word Pair HETA-Psych Form

The HETA-Psych was first given to the Site 1 subjects by the assigned trainer, a staff person known to all subjects tested. After a week of informally familiarizing subjects to words on the HETA-Psych, the trainer began a four week program where the word pairs were presented verbally, once per week, to each subject while he/she was at the work station. Each subject was given 10 seconds to respond to each word pair when the trainer asked, "Do you feel \_\_\_\_ or \_\_\_\_?" Upon receiving a response, the trainer coded the answer, either (1) for a negative response, (2) for an inconclusive response, or (3) for a positive response, according to the weight previously assigned to each word in each pair.

Prior to verbally presenting each pair to the subject, the trainer made a subjective evaluation of the subject for each pair presented, and marked the answer using the same (1), (2), or (3) codes.

Upon completion of analysis, the HETA-Psych was evaluated in terms of response to specific word pairs. Two word pairs from each category, for a total of 10 pairs, were selected, one being the highest rated response, the other being the least rated response. The highest rated response indicated the greatest level of word recognition and least deviation from the emotional norm. The least rated response provided



a check on results obtained from subsequent administerings, especially those obtained from Site 2 subjects.

#### Ten Word Pair HETA-Psych Form

The 10 pairs pulled from the original 20 word pair list were re-randomized and administered to the subjects from the Site 2 training center. The exact procedure was used for the Site 2 subjects as had been used for those at Site 1. The trainer was known to all subjects. Informal familiarization with each word of each pair was accomplished a week prior to actually verbally administering the revised form. Responses were made first by the trainer, then administered to the subjects. Words were weighted the same and were recorded on the revised HETA-Psych (HETA-Psych R, Appendix C). Data analysis of the responses to the 10 pair form was the same analysis used for the 20 pair form.

#### Statistical Analysis

Analysis of variance was completed on data from subject and trainer response to the word pairs. Main sources of variance changed from the original long form to the revised short form. The sources of variance and degrees of freedom for the original long form and the revised short form are presented below. Duncan's Multiple Range Test was used to test differences between main effects at the 5% level.

Original Long Form

	<u>Source of Variance</u>	<u>Degrees of Freedom</u>
(S)	Subjects in Groups	15
(T)	Test Administrations	3
(O)	Observer/Subject Responses	1
(R)	Repetition of Word Pairs	3
	Error	<u>489</u>
	Total	511

Revised Short Version

	<u>Source of Variance</u>	<u>Degrees of Freedom</u>
(S)	Subjects in Groups	15
(T)	Test Administrations	3
(O)	Observer/Subject Responses	1
(R)	Repetition of Word Pairs	1
	Error	<u>235</u>
	Total	255

## RESULTS AND DISCUSSION

The HETA-Psych long form (20 word pairs) and the short form (10 word pairs) was developed to address five emotional states; anger, fatigue, anxiety, depression, and self-concept. Four hypotheses were developed to field test the instrument. These hypotheses will be presented in this section. Discussion of each hypothesis will address the third objective of the study, the emotional states of the subjects and recommended training procedures to compensate for these states.

Comparisons of the Longer Original and Shorter Revised Forms

The shorter revised form of the instrument was found to be comparable to the longer original form for both the subjects and the trainer. Reliability of Site 1 subject and trainer ratings was found to be .98 and .87 respectively on the original form, using the Kuder-Richardson Formula 21 (KR21). Pulling out responses on the basis of the highest positive mean rating and the lowest mean rating for each category, the revised form was subjected to the KR21 for subject and trainer ratings, with results of .95 for both. Site 2 ratings were assessed, again using the KR21, and were found to be .99 and .98 for subject and trainer respectively. These reliability figures would indicate that internal consistency is appropriate for either form.

The mean ratings for both forms for Site 1 subjects are listed in Table 1, with the subjects and trainers rating the five emotional categories similarly on the original form. However, with the shorter revised form, subjects rated themselves significantly less tired and anxious, and with higher self-concept than did the trainer.

Repetitions of word pairs related closely between the two forms with subjects. As shown in Table 2, word repetition ratings were significantly different within each emotional category. The significantly highest rated responses on the original form remained so on the shorter form in every category except self-concept. The highest rated pair was the only pair in the category dealing with subject body image, and ratings may have been made on that basis, since the mentally retarded tend to over-estimate their own physical attributes. When the same pair was included in the revised form, mean ratings leveled out for both repetitions. Apparently, self-concept in the longer original form diluted out responses, with the exception of the second repetition. With inclusion into the shorter revised form, both pairs tended to even out.

The original form tended to illicit slightly lower ratings when compared to the revised form. Anger, fatigue, and depression were all rated lower on the original form with anxiety rated the same on both. Only in the self-concept category did the shorter revised form provide ratings lower than the original form.

The generally lower ratings on the original form, and the self-concept category on the revised form, are probably not due to a flaw in the forms themselves, but rather to the amount of emotions reported. The high correlation between the two forms, as shown by the KR21 ratings, would indicate that the original form responses are accurately reflecting emotional differences when compared to responses on the shorter revised form. These differences are possibly due to a variety of factors, such as a lack of program consistency, inadequate staff training, or many others

TABLE 1. Site 1 subject and observer ratings of emotional states on the original and revised WPA-Psych test.

EMOTION										
	ANGER		FATIGUE		ANXIETY		DEPRESSION		SELF-CONCEPT	
	Original	Revised	Original	Revised	Original	Revised	Original	Revised	Original	Revised
Subjects	2.7 a	2.7 a	2.8 a	2.8 a	2.4 a	2.4 a	2.7 a	2.7 a	2.7 a	2.6 a
Trainer	2.6 a	2.6 a	2.5 a	2.4 b	1.9 a	2.0 b	2.6 a	2.7 a	2.6 a	2.4 b

Note. 3.0 = the most positive rating, 1.0 = the most negative rating for each emotion.

Note. Means with different subscripts in each column are significantly different ( $p < .05$ ).

TABLE 2. Site 1 and Site 2 subjects report on word repetitions of the revised form compared to the original IRTA-Psych test.

Word Repetitions	EMOTION							
	ANGER		FATIGUE		ANXIETY		DEPRESSION	
	Original	Revised	Original	Revised	Original	Revised	Original	Revised
1	2.6 b	-----	2.4 b	2.4 b	1.9 b	-----	2.8 a	2.8 a
2	2.9 a	2.9 a	2.8 a	2.7 a	2.4 a	-----	2.7 a	-----
3	2.7 b	-----	2.8 a	-----	2.5 a	2.4 a	2.6 a,b	-----
4	2.4 c	2.4 b	2.6 a	-----	1.9 b	2.0 b	2.5 b	2.6 b
$\bar{X}$	2.5	2.7	2.5	2.6	2.2	2.2	2.5	2.7
							2.6	2.5

Note. 3.0 = the most positive rating, 1.0 = the most negative rating for each emotion.

Note. Means with different subscripts in each column are significantly different ( $p < .05$ ).

not investigated in this study. While it is impossible to pinpoint causes for the emotional differences, the differences can be quantified using either form. In this case, Site 1 subjects expressed more anger, fatigue, and depression than did subjects at Site 2, while Site 2 subjects expressed lower self-concept than did those at Site 1.

#### Comparisons of Emotional States Over Time

Results of the HETA-Psych indicate that differences in emotional states exist over time in the horticultural environment, although responses vary between sites and between specific emotions. Site 1 subjects reported significantly more anger the first week than for subsequent weeks (Table 3). Similarly, excessive fatigue was reported the first week, but gradually decreased over the following three weeks. Self-concept was reported significantly lower during the second and third weeks, with the highest level of self-concept reported during the fourth week. Anxiety and depression ratings were not significantly different over the four week period, with anxiety being the only category reported with no significant differences from either site. While no significance was noted on Site 1 reports of anxiety, it should be noted that ratings for anxiety were excessively low, ranging from 2.1 to 2.3.

Site 2 subjects reported little anger during the first three weeks, but became significantly more angry during the fourth week (Table 4), a reversal from Site 1 subjects reports of anger. The depression category also indicated variable responses over time, with Site 2 subjects reporting significantly more depression during the second week. Fatigue, anxiety, and self-concept were significantly similar over the period.

TABLE 3. Site 1 horticultural subjects mean ratings of emotional states by week.

WEEK	<u>EMOTION</u>				
	ANGER	FATIGUE	ANXIETY	DEPRESSION	SELF-CONCEPT
1	2.4 b	2.3 c	2.3 a	2.6 a	2.5 a,b
2	2.7 a	2.5 b,c	2.1 a	2.7 a	2.4 b
3	2.7 a	2.7 a,b	2.1 a	2.7 a	2.4 b
4	2.8 a	2.8 a	2.1 a	2.7 a	2.7 a

Note. 3.0 = most positive rating, 1.0 = most negative rating for each emotion.

Note. Different subscripts in the same column indicate significant differences ( $p < .05$ ).



TABLE 4. Site 2 horticultural subjects mean ratings of emotional states by week.

WEEK	EMOTION				
	ANGER	FATIGUE	ANXIETY	DEPRESSION	SELF-CONCEPT
1	2.8 a	2.4 a	2.5 a	2.5 b,c	2.7 a
2	2.8 a	2.3 a	2.4 a	2.8 a	2.7 a
3	2.9 a	2.3 a	2.6 a	2.7 a,b	2.6 a
4	2.6 b	2.3 a	2.5 a	2.5 b,c	2.6 a

Note. 3.0 = most positive rating, 1.0 = most negative rating for each emotion.

Note. Different subscripts in the same column indicate significant differences ( $p < .05$ ).

Reports from Site 1 indicated that only during the fourth week did subjects show significant similarities for all emotions. The first weeks ratings were lowest of the four week period. Site 2 ratings, on the other hand, reported significant similarities for the second week only with the fourth week reports being slightly lower than the others, indicating more negative emotions for that period.

The variability in ratings for each category over the reporting period point out a number of things. First, the specific emotions as reported in this study are much more transitory than the more severe psychopathological disorders to which emotions may contribute. Psychopathology tends to manifest itself in a stable manner over time (Menolascino, 1970). In other words, characteristics of psychopathology will show themselves during almost every administration of an assessment instrument, be it daily, weekly or monthly.

Emotions, on the other hand, do not seem to maintain negatively over time unless in the presence of psychopathology. Anger, for example, was apparently not inclined to carry over from one week to the next. Fatigue, depression, and self-concept all showed much the same pattern although they tended to exhibit more residual from one week to the next, depending upon the site.

Emotions also may be determined by environmental forces, or forces outside the control of the reporting subjects, which could account for their transitory nature. The small sample size of this study enhances this phenomenon. Extremely low ratings by one or two subjects on a given category tend to depress the over-all rating for the group. When one subject is caught in a situation in which he/she has no control, the resulting emotional

response reported creates the kind of high-low-high ratings exhibited in the self-concept category in Table 4.

#### Comparisons Between Greenhouse, Landscape, and Control Groups

The hypothesis of no differences between greenhouse and landscape crews when reporting emotions was substantiated by the Site 1 subjects (Table 5), but not by Site 2 subjects (Table 6), when comparing the horticultural subjects at each site. Site 1 greenhouse prevocational subjects and landscape work adjustment subjects reported no significant differences in any of the emotional categories. Interestingly, the control prevocational group did not differ significantly from the horticultural groups, but the control work adjustment group differed significantly from the other groups in all categories but fatigue.

The responses of both control groups at Site 1 may be due to the idea that the higher functioning the mentally retarded individual is, the more susceptible to emotional difficulties he/she becomes. As work adjustment subjects are at a higher level of training, and thus functioning at a higher level, they are more apt to be caught up in their emotions, probably in terms of both incidence and duration. Conversely, the prevocational control group is less likely to suffer in the same way, because of their lower level of functioning.

As seen in Table 6, comparisons between the Site 2 horticultural groups varied from emotion to emotion. Significant differences were reported for fatigue, with the landscape work adjustment group rating the category as being significantly more tired than the greenhouse group.

On the other hand, the landscape work adjustment group rated self-concept significantly higher than did the greenhouse prevocational group.

It was not expected that the control groups would rate emotions higher than did the horticultural groups at Site 2, but such was the case. The control prevocational group rated four of the five categories higher than did the greenhouse prevocational group, and the control work adjustment group. This may be due to deficits in staff training for the horticultural groups. Staff may not be adequately trained in the medium or the client interactions. Many facilities for the developmentally disabled have utilized untrained, off-the-street help to provide supervision and training for the mentally retarded, depending on on-the-job training to provide sufficient abilities for working with the population. Staff poorly trained in techniques involving the medium being used, or poorly trained in techniques of working with a mentally retarded population, will fail to maximize the effects of the best training programs.

The site facility itself, to the quality of training procedures, and many more items could account for differences. The facility could have an impact for a number of reasons. First, geographical locations may have an impact on how the subject internalizes events around him/her, although little research has studied such a global concept. Second, the administration of the facility may effect subject response to emotion illiciting stimuli. For example, a facility administration may prioritize training programs, and unintentionally convey the importance of the training program to the subject and staff.

The quality of the training program could effect the emotional response of the subject as well. When, for example, ineffective training occurs,

TABLE 5. Mean ratings of Site 1 subjects by group.

GROUP	<u>EMOTION</u>				
	ANGER	FATIGUE	ANXIETY	DEPRESSION	SELF-CONCEPT
Greenhouse (Prevoc)	2.8 a	2.6 a	2.5 a	2.8 a	2.7 a
Landscape (Work Adj)	2.8 a	2.6 a	2.2 a	2.8 a	2.7 a
Control (Prevoc)	2.7 a	2.4 a	2.5 a	2.8 a	2.6 a
Control (Work Adj)	2.3 b	2.6 a	1.7 b	2.4 b	2.1 b

Note. 3.0 = the most positive rating, 1.0 = the most negative rating for each emotion.

Note. Different subscripts in the same column indicate significant differences at  $p < .05$ .

TABLE 6. Mean ratings of Site 2 subjects by group.

GROUP	<u>EMOTION</u>				
	ANGER	FATIGUE	ANXIETY	DEPRESSION	SELF-CONCEPT
Greenhouse (Prevoc)	2.7 b	2.0 b	2.7 a	2.6 a,b	2.4 b
Landscape (Work Adj)	2.7 b	2.4 a	2.4 a,b	2.5 b	2.7 a
Control (Prevoc)	2.9 a	2.4 a	2.6 a	2.8 a	2.8 a
Control (Work Adj)	2.8 a,b	2.2 a,b	2.2 b	2.7 a,b	2.8 a

Note. 3.0 = the most positive rating, 1.0 = the most negative rating for each emotion.

Note. Different subscripts in the same column indicate significant differences at  $p < .05$ .

subjects are denied the stimulation and variety that Blum and Naylor (1968) reported as necessary for motivation.

#### Comparisons Between Subjects and Trainer

As seen in Table 7, the Site 1 trainer and subject ratings indicate that the trainer rated subjects significantly lower in three categories; fatigue, anxiety, and self-concept. For anger and depression, subject and trainer ratings were the same.

Table 8 shows that the Site 2 trainer was fairly accurate in reporting emotions when ratings were compared to subject responses. In only one area, that of fatigue, were significant differences reported, as the subjects rated the category significantly lower than was reported by the trainer. In the remaining four categories, the trainer rated the emotions similarly to that reported by the subjects.

The results indicated that little consistency exists between trainer observations at the two sites. It might be postulated that the differences between trainer ratings are due to real differences between the sites, but this is unlikely. Site 1 subjects were probably accurately reporting their emotions. If this is so, the Site 1 trainer misjudged the level of emotions in the categories of fatigue, anxiety, and self-concept. Conversely, the trainer at Site 2 overrated the fatigue category, and subjects were more tired than the trainer believed. Significant differences from both trainers followed a general trend, either higher or lower, for all categories, not just those with significant differences. The Site 1 trainer tended to rate all categories lower than did the subjects; Site 2 trainer rated them higher.

Two other alternatives would seem to be more plausible in explaining the differences between the two trainers. First, the Site 1 trainer was utilizing the original, longer form of the HETA-Psych. It is possible that the trainer was simply overwhelmed by the number of items administered during the course of the study. In other words, the trainer may simply have become exhausted during the course of verbally presenting a total of 320 adjective pairs every time the form was administered. As a result, the trainer observations were depressed. The Site 2 trainer, with half the number of word pairs to administer at each time, did not experience the same level of fatigue.

The differences in trainer observations might also be explained by the levels of experience each trainer has accumulated. The Site 1 trainer and Site 2 trainer both had approximately the same number of years experience working with the mentally retarded, but the Site 2 trainer had an additional six years experience working with a psychiatric population. This added experience may have been the difference in trainer ratings.

Since trainers are typically used to provide assessment information for both the mentally retarded and psychiatric patients, the results of this study would raise questions concerning the results of such assessments. Assessments currently listed in client records could be changed dramatically simply by re-administering the assessment tool with a different trainer making the observations. This would indicate that more intensive training for those making assessments would be required before observational judgements can be fully accepted, and further points out the value of a self-report format for making assessments.



TABLE 7. Mean ratings of emotions by Site 1 subjects and trainers.

OBSERVER	EMOTION				
	ANGER	FATIGUE	ANXIETY	DEPRESSION	SELF-CONCEPT
Subject	2.7 a	2.8 a	2.4 a	2.7 a	2.6 a
Trainer	2.7 a	2.4 b	2.0 b	2.7 a	2.4 b

Note. 3.0 = the most positive, 1.0 = the most negative ratings of each emotion.

Note. Different subscripts in the same column indicate significant differences ( $p < .05$ ).

TABLE 8. Mean ratings by Site 2 subjects and trainer.

Observer	<u>EMOTION</u>				
	ANGER	FATIGUE	ANXIETY	DEPRESSION	SELF-CONCEPT
Subject	2.8 a	2.2 b	2.6 a	2.6 a	2.6 a
Trainer	2.8 a	2.4 a	2.4 a	2.7 a	2.7 a

Note. 3.0 = the most positive, 1.0 = the most negative ratings of each emotion.

Note. Different subscripts in the same column indicate significant differences ( $p < .05$ ).

## CONCLUSIONS

The HETA-Psych used in this study was developed to assess the emotional status of adult mentally retarded workers in horticultural training programs, although its applicability would extend into any training situation for the retarded. Reliability and the use of appropriate words within the word pairs indicated that the instrument gave accurate readings of emotional status for those mentally retarded workers to whom it was administered.

The study found that both the original and the shorter revised forms of the HETA-Psych were effective in assessing emotional states in adult mentally retarded horticultural workers. Further, it was effective in making comparisons between the two forms using reports from different sites.

Results of the study indicate that emotions vary over time in the horticultural environment, but are transitory in nature and tend not to be maintained, either positively or negatively, unless stimulated by external forces. The small sample size of this study emphasizes this effect to some degree, and more subjects would tend to depress the effect. That emotional states were reported at different levels from one week to the next dispells the hypothesis that no changes will occur in emotional states of the adult mentally retarded horticultural worker over time.

Results of the hypothesis statement of no differences between adult mentally retarded greenhouse and landscape workers when reporting emotional states, proved inconclusive. Site 1 subjects supported the hypothesis while those from Site 2 did not provide the same support. Control subjects clouded the issue somewhat as the prevocational control subjects rated consistently high at both sites.

The hypothesis of no difference between subjects and trainer when reporting emotions was equally inconclusive. At Site 2 little difference was noted, while at Site 1 considerable difference was reported. These results raise questions concerning the efficacy of observer reports of constructs which have traditionally been assessed, in large part, by such observations.

Greenhouse and landscape programs may inherently have positive effects on those workers, but, as of yet, no evidence supports this contention. And if emotions can affect the way the mentally retarded horticultural worker performs in learning the prescribed tasks, or functions on the job, the horticultural therapist must know how to assist the worker deal with these emotions. The first step in dealing with the emotions is to recognize that they are there. Then the therapist must devise ways that training programs might be effective in dealing with the emotions. The HETA-Psych holds promise in fulfilling these functions.

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APPENDIX A  
HOTICULTURE EVALUATION TEST  
(HETA)

PART ONE: IDENTIFYING GREENHOUSE SUPPLIES AND PLANT PARTS

The following are the items to be identified:

Flat  
Clay pot  
Plastic pot  
Perlite  
Soil  
Peat moss  
Watering can  
Trowel  
Clippers  
Plastic Labels  
Hose  
Hose Nozzle  
Warning Sign  
Roots  
Stem  
Leaves  
Flower  
Seeds

Each item will be shown on the television screen for ten seconds and also placed in front of the subject. The tape will go into the pause mode until the subject responds to the question "What is this called?". The item will then be removed, the next item will appear on the screen and be placed in front of him/her. This is repeated for all items listed above.

## PART TWO: WORK SKILL TASKS

All items for each task will be placed in front of the subject before viewing it on the television. The items are pointed to and identified on the tape as the audio is proceeding. After the instructions are completed the tape will go into the pause mode while the subject does the task. Each task will be played up to three times if the subject so requests.

Following is a list of all work skill tasks to be tested, the materials needed for each task and the audio for each task.

Task 1: Writing

Materials: label, pencil, printed label or something to copy

Audio: In front of you is a pencil and label. Use the pencil to copy this word on the label.

Task 2: Counting

Materials: a stack of pots (more than 10)

Audio: In front of you is a stack of pots. Count out 10 pots from the stack.

Task 3: Mixing Soil

Materials: equal amounts of soil, perlite and peat moss in separate piles

Audio: There are 3 piles in front of you. Mix the 3 piles together.

Task 4: Filling a Pot

Materials: planting media and a pot

Audio: In front of you is a pot and planting media. Fill the pot full with planting media.

Task 5: Pressing Soil

Materials: dibble stick(tool), pot filled with planting media

Audio: (Visual will be modeling this task). This part of the tool must go in the center of the pot then press the tool down.

Task 6: Taking a Cutting

Materials: clippers, vine that is marked

Audio: In front of you are clippers. Use the clippers to cut the plant on the mark.

Task 7: Sticking a Cutting

Materials: a cutting, a pot with a hole poked in the planting media

Audio: In front of you is a cutting and a filled pot. Point to the bottom of the cutting.

Place the bottom end of the cutting in the hole in the filled pot.

Task 8: Watering(2 steps)

Materials: water in a watering can, measuring cup with different color lines as measurement marks, potted plant

Audio: Step 1 - In front of you is a watering can, measuring cup and plant. There is water in here. Pour water to the red line in the measuring cup.

Step 2 - Pour the water from the measuring cup in to the pot.

IDENTIFYING GREENHOUSE SUPPLIES	TIME	TALLY/RESPONSE
LEAF		
CLAY POT		
PLASTIC POT		
PEBBLE		
SOIL		
PLANT MIX		
WATERING CAN		
TROWEL		
CLIPPERS		
PLASTIC LABELS		
HOSE		
HOSE NOZZLE		
WATERING SICH		
TOTAL - GREENHOUSE SUPPLIES		
IDENTIFYING PLANT PARTS		
ROOTS		
STEM		
LEAF		
FLOWER		
SEED		
FRUIT		
TOTAL - PLANT PARTS		
TOTAL - BOTH		

  

DATE	EVALUATOR	CONDUCT - TALLY MARK
	SUBJECT	INCORRECT - NO TALLY MARK/ RECORD RESPONSE

BAYING SCALE

IDENTIFICATION SCORE SHEET

TASK	TIME	SCORE	COMMENTS
WEEDING			
COUNTING			
PLANTING SOIL			
FILLING A POT			
PRUNING SOIL			
TAKING A CUTTING			
STICKING A CUTTING			
WATERING			
STEP 1			
STEP 2			
TOTAL SCORES			

## TASK SCORE SHEET

## RATING SCALE

PASS = 3

ATTEMPT = 2

FAIL = 1

DATE

EVALUATOR

SUBJECT

APPENDIX B  
HORTICULTURE EVALUATION TEST  
FOR ADULT DEVELOPMENTALLY DISABLED  
PSYCHOLOGICAL SECTION



THE HORTICULTURE EVALUATION TEST FOR  
ADULT DEVELOPMENTALLY DISABLED-PSYCH  
SECTION

NAME	SCORES:				OBSERVER SCORES:			
SEX	PART				PART			
AGE	I				I			
IQ	II				II			
LOCATION	III				III			
	IV				IV			

  

	SUBJECT SCORES:				OBSERVER SCORES:			
	1	2	3	4	1	2	3	4
1. Discouraged.....2								
2. Hind.....2								
3. Calm.....2								
4. Beautiful.....2								
5. Hopeful.....2								
6. Fast.....2								
7. Sad.....2								
8. Awake.....2								
9. Shaky.....2								
10. Friendly.....2								
11. Tense.....2								
12. Worries.....2								
13. Unhappy.....2								
14. Tired.....2								
15. Weak.....2								
16. Angry.....2								
17. Peaceful.....2								
18. Cheerful.....2								
19. Powerful.....2								
20. Mild.....2								

APPENDIX C  
HORTICULTURE EVALUATION TEST  
FOR ADULT DEVELOPMENTALLY DISABLED  
PSYCHOLOGICAL SECTION REVISED

THE PORTLAND-THURE EVALUATION TEST FOR  
ADULT DEVELOPMENTALLY DISABLED-PSYCH  
SECTION

NAME \_\_\_\_\_  
SEX \_\_\_\_\_  
AGE \_\_\_\_\_  
IQ \_\_\_\_\_  
IQ \_\_\_\_\_

PART I  
II  
III  
IV

PART I  
II  
III  
IV

	SUBJECT SCORES:				OBSERVER SCORES:			
	1	2	3	4	1	2	3	4
1. Sad.....2.....Joyful	—	—	—	—	—	—	—	—
2. Discouraged.....2.....Pleased	—	—	—	—	—	—	—	—
3. Cheerful.....2.....Gloomy	—	—	—	—	—	—	—	—
4. Friendly.....2.....Unfriendly	—	—	—	—	—	—	—	—
5. Fast.....2.....Slow	—	—	—	—	—	—	—	—
6. Tense.....2.....Relaxed	—	—	—	—	—	—	—	—
7. Tired.....2.....Alert	—	—	—	—	—	—	—	—
8. Mild.....2.....Upset	—	—	—	—	—	—	—	—
9. Powerful.....2.....Feeble	—	—	—	—	—	—	—	—
10. Calm.....2.....Nervous	—	—	—	—	—	—	—	—

APPENDIX D  
INFORMED CONSENT FORM

## INFORMED CONSENT STATEMENT

You have been asked to take part in a research project. This research is being done at Kansas State University, and will help us understand why people like, or don't like, horticulture.

You don't have to take part in this research if you don't want to. That's O.K. You will not be punished in any way.

I hope you will be part of the project the whole time, but you can leave it any time you want. That is O.K. and you will not be punished in any way.

Here is what you will do. You will be asked some questions every week about how you feel while you are at work. It will take about 10 minutes a week for four weeks, and you can keep right on working the whole time it is going on. That way you won't lose any pay.

I don't have any money or anything else to give you, but I will be very grateful for your help.

How you feel is very private and sometimes people feel embarrassed to talk about it. So, I promise not to tell anyone else what you say.

Do you have any questions?

If you will take part in this research, please sign below:

NAME \_\_\_\_\_ DATE \_\_\_\_\_

Parent or Guardian: I have read the orientation statement above, and have been fully advised of the methods to be used on my child in this study. I understand the potential risks, as described, and hereby assume them voluntarily on behalf of my child.

NAME \_\_\_\_\_ DATE \_\_\_\_\_

Please sign all copies, keep one for your records, and return the rest.

A SELF REPORTING SCALE FOR INDICATING  
EMOTIONAL STATES OF DEVELOPMENTALLY DISABLED  
ADULT HORTICULTURAL WORKERS

by

STEPHEN C. MOORE

B.S., Kansas State University, 1974

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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Horticulture

KANSAS STATE UNIVERSITY  
Manhattan, Kansas

1985

In an effort to substantiate reported positive effects of horticultural activities on the mentally retarded, the Horticulture Evaluation Test for Adults--Psychological Section (HETA-Psych) was developed.

The HETA-Psych was administered to 32 subjects from two training centers for the developmentally disabled. Half of the subjects at each site were involved in horticultural training programs consisting of both prevocational and work adjustment activities. The 16 non-horticultural control subjects were involved in other prevocational and work adjustment programs.

Twenty word pairs associated with five emotionally related categories (anger, fatigue, anxiety, depression, and self-concept) were administered once a week for a total of four weeks at one site. Means were taken for each word pair, and the pairs with the highest and lowest means in each category were extracted from the instrument, then combined into a 10 pair version (HETA-Psych R) and re-administered at another site.

Internal consistency of responses from both forms of the instrument was assessed using the Kuder-Richardson Formula 21, which yielded correlations for subjects and trainer of .98 and .87 respectively on the long form. The short form yielded subject/trainer correlations of .95 for both at one site, and .99 and .98 respectively at the other site.

Reports by subjects indicated that mentally retarded adults experience significant emotional shifts in the horticultural environment, dependent on time and location. Anxiety was the least mobile and lowest overall rated of the emotions assessed. Reports of differences in emotional states between horticultural activities were confirmed at one site but not the other. The same was true concerning differences between subjects and trainer.